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FRIEDRICH KUEFFNER
317 MADISON AVENUE, SUITE 910
NEW YORK, NY 10017

EXAMINER	
JUETTNER, ANDREW MARK	

ART UNIT	PAPER NUMBER
3749	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/555,854	SCHMIDT ET AL.	
	Examiner	Art Unit	
	ANDREW M. JUETTNER	3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *22 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The following is a Final Office action in response to communications received on February 22, 2008. Claims 1, 3, 4-7, and 9 have been amended. Claims 1-12 are pending and addressed below.

Response to Amendment

2. Applicant's amendments to claims are sufficient to overcome the 35 U.S.C. 112, second paragraph, rejections set forth in the previous action.

3. Applicant's amendments are not sufficient to overcome the objection to claim 4 under 37 CFR 1.75(c), as being improper dependent form for failing to further limit the subject matter of a previous claim, as set forth in the previous action. Claim 4 has been amended but still recites that the cooling is based upon a physical-mathematical cooling model. The model, as indicated in the previous action, is an abstract idea. Claim 4 still fails to recite a practical application of the abstract idea that results in a physical transformation or a useful, concrete, and tangible result. As previously indicated, without the practical application of the model all that is positively recited in claim 4 is the limitations of claim 1. Therefore, claim 4 still fails to further limit the subject matter of claim 1 from which it depends.

Claim Objections

4. Claims 1-3 are objected to because of the following informalities:

I. Claim 1 is objected to because there is no clear transition from preamble to the body of the claim.

II. Claim 1 is objected to because the method is written in passive voice and should be amended to active voice.

III. Claims 2 and 3 are objected to because they recite that cooling water is directed against the slabs. However, it is unclear that "cooling water" refers to the cooling water of claim 1. "Said" or "the" should be included to indicate that it is the cooling water from claim 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claim 4 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification does not disclose how to perform cooling of the slabs and sheets which is carried out based on a physical-mathematical cooling model, which describes the nonsteady time-temperature behavior of the sheet/slab with the boundary conditions of the temperature-dependent physical characteristics and with the heat-transfer coefficient, which depends on the local surface temperature of the slab/sheet, wherein the temperature distribution over the thickness of the product to be cooled is computed by dividing the slab/sheet into individual layers and using the finite-element

method and the Fourier law of heat conduction. The specification does not disclose how to base the cooling on the model. How are the slabs broken down into grids so that the model may be applied to them? How are the calculations used to modify or control the cooling? One having ordinary skill in the art would not know how to perform the claimed method without undue experimentation.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites the cooling of the slabs and sheets is carried out based on a physical-mathematical cooling model, which describes the nonsteady time-temperature behavior of the sheet/slab with the boundary conditions of the temperature-dependent physical characteristics and with the heat-transfer coefficient, which depends on the local surface temperature of the slab/sheet, wherein the temperature distribution over the thickness of the product to be cooled is computed by dividing the slab/sheet into individual layers and using the finite-element method and the Fourier law of heat conduction. It is unclear what is meant by “based on” in the recitation in claim 4. What is actually computed and used in the cooling of the slabs and sheets? How is the model used to control the cooling? On having ordinary skill in the art is not appraised as to the scope of the claim recited.

Claim Rejections - 35 USC § 103

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10. Claims 1, 4-5, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,820,705 to Yu et al. (Yu) in view of US Patent 3,680,344 to Manthey et al. (Manthey '344).

In Reference to Claim 1

Yu teaches:

> Method for cooling or quenching slabs and sheets with water in a cooling basin (62), wherein cooling water is directed laterally against both sides of the slabs and sheets (spray heads 60 in basin directed sideways; see fig. 4., column 11, lines 42-46).

Yu does not explicitly disclose:

> The slabs and sheets, which have first been set upright by a tilting device, are lowered and temporarily maintained on edge.

Manthey '344 teaches:

> The slabs and sheets (1), which have first been set upright by a tilting device (jaws 4 tilt slab 1; see fig. 1, column 2, lines 33-43), are lowered and temporarily maintained on edge (slabs 1 are lowered in pool 6 by crane 16; see fig. 1, column 3, lines10-15).

It would have been obvious to one having ordinary skill in the art at the time of the invention to add the tilting device as taught by Manthey '344 to the cooling basin of Yu

in order to quench or cool a flat slab without pockets of steam (due to flash boiling of the quenching liquid) from collecting along the lower surface of the slab resulting in uneven cooling as occurs when quenched while in a substantially horizontal position as taught by Manthey '344 (column 1, lines 13-18).

In Reference to Claim 4

Yu as modified by Manthey '344 teaches the method in accordance with claim 1 (see rejection of claim 1 above). Yu as modified by Manthey '344 fails to disclose that cooling of the slabs and sheets is carried out based on a physical-mathematical cooling model, which describes the nonsteady time-temperature behavior of the sheet/slab with the boundary conditions of the temperature-dependent physical characteristics and with the heat-transfer coefficient, which depends on the local surface temperature of the slab/sheet, wherein the temperature distribution over the thickness of the product to be cooled is computed by dividing the slab/sheet into individual layers and using the finite-element method and the Fourier law of heat conduction.

Examiner takes official notice that it is notorious, old, and well known in the art to carry out cooling based on a physical-mathematical cooling model, which describes the nonsteady time-temperature behavior of the sheet/slab with the boundary conditions of the temperature-dependent physical characteristics and with the heat-transfer coefficient, which depends on the local surface temperature of the slab/sheet, wherein the temperature distribution over the thickness of the product to be cooled is computed by dividing the slab/sheet into individual layers and using the finite-element method and the Fourier law of heat conduction.

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the cooling of the slabs as taught by Yu as modified by Manthey '344 with the cooling model, that is well known in the art, in order to more accurately predict the cooling of the slabs and to enhance control of the cooling to achieve a desired resulting product and improved uniformity.

In Reference to Claim 5

Yu as modified by Manthey '344 teaches:

> Method in accordance with Claim 1, wherein the cooling water is directed by jets (Yu spray heads 60 direct the stream of cooling water), and the water pressure and/or the volume flow of the cooling water jets is automatically controlled (Yu column 11 line 59-column 12 line 19; microprocessor controls valves for that control the flow of the cooling water and the air and carbon dioxide mixed therein).

In Reference to Claim 7

Yu teaches:

> Device for cooling or quenching slabs and sheets with water in a cooling basin (see fig. 4), especially for carrying out the method in accordance with Claim 1, wherein the cooling basin has jet devices (60), which are arranged on both sides of the lowered slabs/sheets (spray heads 60 are in two groups with work piece to be inserted between them; see fig. 4, column 11, lines 43-46), are directed laterally towards their broadside surfaces (see fig. 4, spray heads 60 directed to

side), and are connected to a cooling water circulation (see fig. 4, column 11, lines 47-67), which has means for lowering the water level from a maximum, upper water level to a low, lower water level (means-plus-function, corresponding structure is pump to remove water from basin; exit port 66 with a pump 72 and overflow port 68).

Yu does not disclose:

The slabs and sheets, which have first been set upright by a tilting device, are lowered and temporarily maintained on edge.

Manthey '344 teaches:

The slabs and sheets (1), which have first been set upright by a tilting device (jaws 4 tilt slab 1; see fig. 1, column 2, lines 33-43), are lowered and temporarily maintained on edge (slabs 1 are lowered in pool 6 by crane 16; see fig. 1, column 3, lines10-15).

As noted above in the rejection of claim 1, it would have been obvious to one having ordinary skill in the art at the time of the invention to add the tilting device of Manthey '344 to the cooling basin of Yu in order to quench a flat slab without pockets of steam collecting along the surface of the flat slab resulting in uneven cooling as taught by Manthey '344.

11. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu in view of Manthey '344 as applied to claim 1 above, and further in view of US Patent 3, 556,877 to Ujiie (Ujiie).

In Reference to Claim 2

Yu as modified by Manthey '344 teaches the method in accordance with claim 1 (see rejection of claim 1 above) but fails to disclose wherein the slabs and sheets are fully immersed in a cooling basin filled with water, and, in addition, cooling water is directed against them in the water bath of the cooling basin.

Ujiie teaches wherein the slabs and sheets (9, work piece to be quenched, in this case a tubular structure) are fully immersed in a cooling basin filled with water (part of tubular structure be quenched is immersed; Column 2, lines 35-41), and, in addition, cooling water is directed against them in the water bath of the cooling basin (cooling medium injection pipes 5 spray cooling medium on both sides of immersed tubular structure that is immersed, see fig. 1, column 2, lines 15-21).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the cooling basin of Yu to use the sprayer heads (60) on a part immersed in cooling medium as taught by Ujiie in order to facilitate the quenching process as taught by Ujiie (column 2, line 65-66).

In Reference to Claim 3

Yu as modified by Manthey '344 and Ujiie teaches:

> Method in accordance with Claim 2 (see rejection of claim 2 above), wherein the water level in the cooling basin is lowered (Yu pump 72 and drain 68 are provided to remove liquid from the vessel 62) the slabs and sheets project above the water level, and cooling water is directed at the slabs and sheets (Yu column 16, line 64-column 17 line 2; partial immersion of part along with spray quenching).

12. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yu in view of Manthey '344 as applied to claim 5 above, and further in view of US Patent 3,738,629 to Coleman (Coleman).

Yu as modified by Manthey teaches the method in accordance with claim 5 (see rejection of claim 5 above), but does not disclose wherein the distance of the jets from the surface of the slabs and sheets is automatically controlled.

Coleman teaches the distance of the jets from the surface of the slabs and sheets being automatically controlled. Coleman discloses that as a work piece pass between rolls 92, 94, roll 92 is forced upward (column 7, lines 11-13). As roll 92 is forced upward, yokes 160 are also directed upward so that link chains 166, 168 raise quenching manifold F upwardly (column 7, lines 21-24). Coleman explicitly teaches that this be done in order to facilitate symmetrical quenching fluid spray pattern to the work piece (abstract, column 7, lines 30-32).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the cooling basin of Yu with a sprayer adjusting mechanism as taught by Coleman in order that a symmetrical cooling spray pattern can be maintained. One having ordinary skill in the art would know how to adapt the sprayer adjusting mechanism of Coleman for use in the cooling basin of Yu.

13. Claim 8 rejected under 35 U.S.C. 103(a) as being unpatentable over Yu in view of Manthey '344 as applied to claim 7 above, and further in view of US Patent 5,795,538 to Abukawa et al. (Abukawa).

Yu as modified by Manthey '344 teaches the device in accordance with Claim 7 (see rejection of claim 7 above), but does not disclose wherein the cooling basin is connected by flow with a pump receiving basin.

Abukawa teaches wherein the cooling basin (8) is connected by flow (see fig. 4) with a pump receiving basin (tank 2 receives overflow from quenching chamber 8 and is connected to a circulation system with a pump 12, see fig. 4).

It would have been obvious to one having ordinary skill in the art at the time of the invention to add a pump receiving basin as taught by Abukawa to the cooling basin of Yu in order to collect overflow cooling water and re-circulate the cooling water.

14. Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu in view of Manthey '344 as applied to claim 7 above, and further in view of US Patent 4,036,243 to Manthey et al. (Manthey '243).

In Reference to Claim 9

Yu as modified by Manthey '344 teaches a device in accordance with Claim 7 (see rejection of claim 7 above), but does not disclose a raisable and lowerable carriage, wherein the cooling basin is designed with tracks for a raisable and lowerable carriage that holds a slab or a sheet.

Manthey '243 teaches a raisable and lowerable carriage (16) wherein the cooling basin is designed with tracks (guide rails 13', 13'', see fig.2, 3) for a raisable and lowerable carriage that holds a slab or a sheet (13', 13'' guide path of carriage, column 3, lines 5-7).

It would have been obvious to one having ordinary skill in the art at the time of the invention to substitute the carriage and lowering device of Manthey '243 with the tracks for the lowering device of the cooling basin of Manthey '344 in order to reduce the weight of the device as explicitly taught by Manthey '243 referring to Manthey '344 (column 1, lines 49-52).

In Reference to Claim 10

Yu as modified by Manthey '344 and Manthey '243 teaches:

> Device in accordance with Claim 9 (see rejection of claim 9 above), wherein the carriage (16) is connected to a cable drive (cable 23 connected to pulley 24 and driven by hoist motor 27; see column 3, lines 5-10 and lines 46-50).

In Reference to Claim 11

Yu as modified by Manthey '344 and Manthey '243 teaches:

> Device in accordance with Claim 10 (see rejection of claim 10 above), wherein the cable drive has cables (23; column 3, line 48), which are guided by cable drums mounted on the carriage (pulley or sprocket 24), and the cable drums are mechanically coupled (sprockets 24 are on a common shaft 25) with a frequency-controlled three-phase motor (hoist motor 27 with transmission 26).

In Reference to Claim 12

Yu as modified by Manthey '344 and Manthey '243 teaches:

> Device in accordance with Claim 9 (see rejection of claim 9 above), wherein the carriage (16) is guided on the tracks (13', 13'') by rollers or wheels (17; see fig. 2, 3; column 3, lines 5-7).

Response to Arguments

15. Applicant's arguments filed 22 February 2008 have been fully considered but they are not persuasive.

Applicant argues on page 8 that the Yu and Manthey '344 references, alone or in combination do not teach claims 1, 3-5, and 7. Applicant argues that the references and specifically Yu does not teach spraying water laterally against the sides of the slabs; that Yu only teaches a general spraying onto the part. Yu does teach a preferred embodiment where water is sprayed into the vessel for quenching parts lowered therein (see fig. 2). However, Yu also discloses an alternative embodiment where the sprayers 60 are arranged vertically in two columns with the water spray directed to the center of the arrangement (see fig. 4). Although, Yu does not explicitly discuss a motivation for this arrangement it does teach that the sprayers can be arranged to spray water laterally into the area for the part to be quenched in lowered, as seen in figure 4.

Applicant also argues that Manthey '344 does not teach the possibility to laterally spray the sides of the slab. Examiner agrees with the applicant that Manthey '344 does not explicitly disclose having water sprayers located to laterally spray the sides of the slabs. However, this is not persuasive as Yu does teach the sprays as indicated above. Manthey '344 is a teaching of a known mechanism used to tilt and lower slabs in to a basin. Manthey '344 is not relied upon to show a teaching of the lateral water sprayers but as a teaching of a transport mechanism for metal slabs.

Applicant on page 9 of the response argues that Manthey '344 only teaches a construction suited for inserting slabs into a pool of water. Examiner disagrees with this

characterization of the reference. Although, the reference does teach the transporting mechanism being used to insert the slab into a pool of water, the tilting mechanism 4 and the cranes 16 are capable of use to lower slabs into a basin which may contain more than just a pool of water. The openness of the crane construction, as seen in figure 2, would allow for water to be sprayed against the slabs through the open area of the crane and brackets 18.

Applicant argues that the combination of Yu and Manthey '344 does not teach the method presently claimed. Examiner disagrees based on the discussion of applicant's arguments above and the rejection of claims 1, 3-5, and 7 above, Yu does teach a basin where water is laterally sprayed against parts to be quenched and Manthey '344 teaches a known transportation mechanism that can tilt slabs and lower them in to a basin for quenching. Applicant's arguments do not overcome the rejections of claims 1, 3-5, and 7.

Claims 2, 6, and 9-12 are dependent on rejected claims. Applicant makes a broad statement of patentability in referring to the remaining rejections. Applicant fails to specifically point out how the language of the claims patentably distinguishes them from the references. Therefore, the rejections of claims 2, 6, and 9-12, based upon prior art references as indicated above, are maintained.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANDREW M. JUETTNER whose telephone number is (571)270-5053. The examiner can normally be reached on Monday through Friday 7:30am to 5pm Est..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve McAllister can be reached on (571) 272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AMJ

/A. M. J./
Examiner, Art Unit 3749

/Steven B. McAllister/
Supervisory Patent Examiner, Art Unit 3749